AN ANALYSIS OF OPINIONS OF FIFTH GRADE STUDENTS TOWARD COMPUTER NETWORKING

MASTER'S PROJECT

Submitted to the Department of Elementary Education,
University of Dayton, in Partial Fulfillment
of the Requirements for the Degree
Master of Elementary Education

by

Marcia Sue Hayes
UNIVERSITY OF DAYTON
at Capital University
Columbus, Ohio
April,1995

Approved by:

Official Advisor

TABLE OF CONTENTS

LIST OF TABLES

DEDICATION

This is dedicated to husband, Bill, my children, family and friends who helped, encouraged, read, nagged, and coerced me to get this done. (Especially Shirley who went through this with me - See Welshans, Shirley to see if she made it)

Thanks to my husband who cooked extra, paid extra, and expects to retire sooner. Now get going and get your degree!

Thanks also to my wonderful, helpful students and their enthusiasm for learning - may there be more of it.

Thanks to technology...responses welcome to

mshayes@freenet.columbus.oh.us

CHAPTER I

INTRODUCTION

Purpose for the Study

Elementary students are usually eager to learn about and use computers. However, many students have serious misunderstandings about computers. Most students are able to use computers, but when students are introduced to the next step in their computer instruction, they become unsure of themselves and resist the new learning. The students want to continue with what they have already learned. For example, if students are asked what they think of their ability to use the computer with the popular software program Kid-Pix, they are very positive and excited. They eagerly show what they have done and want to teach others what they have learned. Then if the teacher attempts to move on and asks students how the keys they push on the keyboard end up on the monitor screen, they are unsure and less confident of themselves.

At the elementary school where the author teaches, students begin using computers in kindergarten and progress their computer education through fifth grade. At the third grade level, they are introduced to how computers work. Students begin by studing switches, electrical circuits, cables, binary language, and codes. In one lesson, students are asked what they think is inside the computer. They

generally state that the inside of a computer is filled with many flashing lights, boards, numerous wires going in different directions, huge electronic brains attached to boards, large boxes that have "danger" on them, and large, complicated on-off switches.

After this brainstorming session has ended, the teacher opens the case of an Apple IIe to let students look at what is inside the computer. There was a large circuit board full of components at the bottom of the box, two small cards standing upright near the back, and a box which holds the power supply on the side. Two ribbon cables are also near the back. However, the main portion of the box was empty. Students were amazed to see that there is so little inside. They ask how the computer can do so much with so little. During this lesson, the computer has been reduced from a mysterious, magic box to a tool that students know they can operate without fear.

This type of computer education is necessary because schools are expected to provide introductory computer education and to give students positive experiences using computers. The current educational inclination is to move from the traditional "three R's" education toward a curriculum which also includes computers in order to increase cognitive skills (Dalton & Goodrum, 1991). Students must learn to use computers without fear, anxiety, hostility, and apprehension (Gardner, Discenza, & Dukes, 1993). A school's computer

curriculum must be progressive and designed to keep up with current advances in the electronic world (Dalton & Goodrum, 1991).

One computer advancement which helps students learn higher cognitive skills is the use of networking. Students who have been introduced to networking in elementary school have a crucial advantage in computer knowledge and thus may have a more positive opinion about their computer competence. Use of a networking system such as Internet, gives students access to considerable information and contact with students in classrooms around the world. Students who use networking share knowledge that expands their global knowledge, facilitates cooperative problem solving, and considers ideas that stretch minds (Martinelli-Zaun, 1993).

In the early 1990's, then Senator Al Gore stated that schools need to be a part of the coming "information highway" (Bishop, 1990). Government officials promised schools and educators access to the world through networking without cost (Maddux, 1994). Networking is only beginning to be used in the classroom. Networking is in the initial phases and changes daily, but the possibilities are endless.

In order to keep up with everchanging technology, Butzin (1990) stated that teachers must learn and teach networking in schools to adequately prepare students for the business and educational world. This may mean quite a change from current curriculum priorities, but decisions about future

priorities need to be assessed by teachers and administrators. Networking challenges students and brings closer worlds that had been distant and unreachable and available only in books.

Research Statement

The purpose of this study was to compare and contrast the opinions of fifth grade students toward the integration of computers with electronic networking communications.

Assumptions

In order to carry out this study, a pretest and posttest questionnaire with a Likert-type rating scale was used to measure students' opinions toward computers and networking (See Appendices A and B). The writer assumed that students honestly answered the questionnaire. The writer also assumed that the testing questionnaire was reliable and measured the opinions that it intended to measure.

Limitations

A limitation of the study was the small sample of students used in the survey. The writer used a class of twenty-five inner city fifth grade students as a computer networking group.

Another limitation was the location of the computer with networking capabilities. The computer was in the library which means the networking group can access the network only when the library does not have a class scheduled.

Definition of Terms

Freenet is the local access provided to members to Internet. The access is located at a computer at a local large university.

E-mail is the electronic mailing system used in Internet.

Internet is the world-wide network for information retrieval, discussion groups, educator communications, and other information systems.

Information Archive is where information is electronically stored at universities, government facilities, or industry sites.

Inner-city fifth graders are the students who live within the city limits and attend an urban area school.

Nerds are students who are perceived as weird because of their proclivity towards learning.

Networking means to connect your area to other areas using computers and telephone lines.

Opinion is a student's stated feeling - positive, negative, or somewhere in between - toward a given subject.

CHAPTER II

LITERATURE REVIEW

Classroom Use of Networking

It is currently popular to publish, talk about, or read about anything to do with computer networking. Design and manufacture of computers is a fast-moving industry. It is widely accepted that as soon as a product is out on the market it is outdated. There is always something bigger, better, and faster being designed. A few years ago, several on-line information companies were eagerly bought by the people wanting information services. Now Internet is being praised as the preoccupation of the people because it has more services and is a generally a free service.

Many people appreciate and use the information and services Internet has to offer. Internet is popular as a social tool, an educational instrument, a research device, and an informational outlet. Internet sometimes comes across as the most important item that anyone with a computer can have access to. There are so many uses to Internet because the branches of the menu programs are nearly limitless.

This project focuses on the educational uses of networking with special attention to how the educational uses of networking might help students form a favorable opinion of computer use. Maddux (1994) stated that classroom use of

networking through Internet can be of great value by making the curriculum meet more individual student needs. The use of Internet projects and resources can add great student interest to a curriculum area. However, the teacher must research topics and choose carefully.

Maddux (1994) stated that while in the past she has been reticent about encouraging the classroom use of computers, the information potential of Internet makes its use in classrooms an immense educational value.

A most useful component of Internet is E-mail. This area of Internet allows free or low cost communications between people or classrooms in the United States. Communications may also be established between people or classrooms in other countries. Poling (1994) stated that classroom use of networking using E-mail communications as a teaching supplement is overwhelmingly positive and effective for students. Using E-mail is not difficult, but it takes time to allow students to learn which item from the menu to choose so they do not get lost and frustrated.

This author's students used E-mail communications to participate in projects worldwide and then E-mailed the results of the project or student questions and responses to the classroom which instigated the project. The students were initially unmotivitated while choosing and filling out the questionnaires derived from the computer. However, when they received responses from their communications, they realized

they were actually talking to other people in the world and got more enthusiastic about researching projects and contacting more classrooms. Poling (1994) stated that while using E-mail communications his classes increased their cooperation, efficiency, language skills, interest in social sciences, and demonstrated a desire for further exploration into the world of computer communications.

Donovan and Sneider (1994) stated that technology is a natural compliment to most skill areas. Language arts, grammar, reading skills, and semantic structure are also increased by networking. The journals of reading teachers praise the motivating work of computers and networking projects. Computers can also help increase student mathematical skills such as problem solving, communications, reasoning, mathematical connections, conceptual understanding, and symbolic sense.

The classroom use of new technology such as networking can help meet the standards of the National Council of Teachers of Mathematics (NCTM) (Donovan & Sneider, 1994). Mathematics instruction can be enhanced through networking by contacting research facilities, asking questions of experts in the "real world", participating in projects which enhance mathematical understanding, and classroom to classroom cooperative projects. Problem-solving is a high priority in the new learning designs. Dalton and Goodrum (1991) showed that the inclusion of technology in the curriculum increased the

students' problem solving capabilities and increased students' opinions regarding their use of computers. However, Todman and Dick (1993) showed that classroom use of computers in any area increased student motivation and opinion.

Through classroom use of networking, students can contact other students, access computer programs, and research information archives (Allen & Mountain, 1992; Dyrli, 1994; Etchison, 1994; Harris, 1992; Martinelli-Zaun, 1993; Roempler & Warren, 1993; Tennant, 1992). Contacting other students via e-mail was an important step in motivation. The students suddenly realized that they were going beyond their community and contacting somewhere else in the world. Now that distant part of the world was a part of their community. Students were not writing exercises for practice, but were communicating with real people - new friends who they wanted to send information to and who must understand what they were writing. Students understood this even more when they received letters from distant students and were frustrated because they could not understand parts of letters due to poor grammar or many misspelled words.

The research area of Internet was also useful. Students often come up with questions and "what ifs" that the teacher could not answer. In the past, the teacher worked with the student to research the question to find the answer. In many occasions, the answer after hours of research was "I don't know" or frustration because research books were out of date.

Using networking, students communicated directly with experts in the scientific field (Roempler & Warren, 1993). Students E-mailed their questions to scientists, mathematicians, government officials, or any other specialists. Waiting for an answer was difficult. Some answers came quickly, others took two weeks. Some questions have not been answered yet.

Classroom use of networking activities seemed to have a positive effect on students. Motivation, cooperation, and opinions about computers seemed to increase during the project. In this section, the author discussed classroom use of networking, in the next section the author examined the effects that networking seemed to have on students' opinions towards computers.

Effects of Networking on Computer Opinion

Butzin (1990) stated that one effect of networking in the classroom is that networking increases computer learning and motivation which also reduces discipline problems. Teachers are continually searching for ways to keep students' attention while maintaining discipline control in the classroom. Perhaps these two major problems of teaching can be aided by computer use. The use of computers seems to keep behavior problems at a minimum. Students who usually act out in class seemed to be fascinated by the computer activities

and worked for an extended time without disruptive behavior.

Poirot (1992) stated that another effect of networking in the classroom is that educators believe that motivation is the ultimate key to students' success in the classroom. It is believed that daily use of technology, even for short periods of time, may provide that change of pace necessary for the bored student, the challenge needed by the gifted student, or the individualized instruction needed by the at-risk student. If a student's opinion towards education can be improved and if that change can be traced in part to the use of technology then the technology used should be deemed a success (Poirot, 1992). Networking can have a positive effect because it brings energy and a strong motivational aspect to the classroom (Eisenberg, 1992).

A study by Askar, Yavus, and Koksal (1992) on the effect of computers and networking showed that students held favorable opinions of computer learning. Younger students especially liked the colors and the graphics. Older students thought computer learning was enjoyable and interesting. Later studies by Funkhouser (1993) showed that positive affective side effects of computer instruction included significant increases in problem-solving abilities and a more positive opinion of mathematics in both girls and boys. The use of networking as a step in the computer instruction sequence also causes positive effects in many areas of learning. An effect of networking on computer opinion is

that there is a positive relationship between student opinions and a computer assisted learning environment (Todman & Dick, 1993).

The author has shown that networking can increase computer opinion and can be a positive motivational tool in education, but there are some drawbacks. Networking has some inconveniences and problems of which teachers should be aware. In the next sections, the author addressed some problems associated with networking.

Potential Problems with Networking

A potential problem with networking is that future access to Internet may include fees for access and time used even though officials now promise that access will always be free to schools (Maddux, 1994). At the present time access through Freenet to Internet is free. Corporate sponsors pick up most of the costs and charges. Individuals are asked to contribute yearly to help reduce the costs, but contributions are not mandatory to use the system. If asked to pay connection charges, schools would most likely drop out since funds are scarce.

At the present time, many schools are searching for funds to set up a networking system. The telephone line seems to be a major stumbling block. If the installation of a line is granted, then other questions arise. Who pays the telephone

bill and what happens if someone abuses the line by calling lines that charge or making many long distance calls?

Poling (1994) stated that a potential problem with networking is that access to computers is costly and limited. The purchase of additional software, modems, printers, and other equipment might be necessary to upgrade existing equipment to use networking. Sometimes existing computers are too old and slow to be useful. New equipment may be necessary. However, the money to buy the new equipment may not be available.

After obtaining the correct equipment, there are sometimes other roadblocks to a successful program. Butzin (1990) stated that a potential problem with including the use of networking in the schools is that school curricula and priorities must change. Teachers who have always taught a certain way may resist a new style of teaching and so some students might not receive progressive instruction in the use of computers. There may be gaps in the computer education of students who have not used computers in a grade. There will also be differences in the curriculum adopted by school districts and differences in how and in what areas the computer is used. The number of computers used may also make a difference in student opinion. Some schools may have one computer per classroom, other schools may have a computer center, and others may have a computer assigned to each student, like a textbook.

A potential problem with networking is that there is never enough time to give students all the information needed to do everything the teacher wants to do (Butzin, 1990). When students work at computers, time seems to pass at a faster rate. Students become frustrated when their time is up and their project is not finished. Students also do not like waiting their turn for the computer. They watch the clock, shout out time elapsed, and cannot concentrate on the lessons continuing in the classroom.

Another problem with networking is that the teacher must actively monitor the students' computer connections. This is especially true while Internet is in the formative stages and is generally unguarded. Connections and conversations with inappropriate adults posing as a child's keypal for immoral purposes must be guarded against. Also, students must be protected from access to files which contain seemingly innocent cartoon characters, pre-school television friends, or games but actually contain x-rated stories or pictures.

Although problems exist, the Internet system attempts to examine each entry to the networking system to assess its appropriateness. If the teacher is aware of potential problems and supervises students activities, there should be no problems. The positive outcomes of using networking greatly outweigh any potential problems.

In this section, the author discussed the classroom use of networking, the increased motivation and decreased discipline

problems associated with computer use, the effects of networking on computer opinion, and some potential problems with networking.

CHAPTER III

PROCEDURE

Subjects

The subjects of this study were twenty-five inner-city fifth grade students who attend a math and science alternative school. Thirteen students are female and twelve are male.

Ten students are consistently in the "A" to "B" grade range. Ten other students are in the middle range. Five others rarely do homework or study for tests and seem to show little regard for the resulting consequences or the accounting motivation.

One of the male students is mainstreamed from a severely behavioral handicapped class, and two other students - one male and one female - have been behavior transfers to the school after being repeatedly expelled from their school. Another of the girls is repeating fifth grade. Two other girls have been identified as learning disabled. One girl is suffering the effects of an accidental drug overdose in second grade. Three boys and two girls are receiving extra help with mathematics based on low city-wide test scores. Eight students read below third grade level, but they only receive specialized classroom instruction.

The class was quite social and talkative. Cooperative groups are used in the class, so peer assistance was encouraged. Groups also work together to earn bonus awards.

Behavior must be watched constantly. Students do fairly well in the classroom setting with few disruptions, but some students become volatile during recess and unstructured times.

Setting

School. The school is a mathematics and science alternative school in a large urban area. The alternative school interviews and selects the teachers for its staff on the basis of whether or not the prospective teacher's style of teaching corresponds with the school's hand-on mathematics and science curriculum. Computer literacy is also a priority of student learning. A computer curriculum, which begins at kindergarten and advances progressively through fifth grade, was written by the staff.

Some students attending the alternative elementary school were selected on a lottery basis after applying to attend the school. However, the majority live in the neighborhood. Eighty-eight percent of the students participated in the federally funded lunch program.

Community. The community is a poor, crime ridden area of the city. Few parents are active in the Parent Teacher Organization. Safety going to and from school is a concern. Most families are one-parent families. Multi-generational families living in one household are also common. However, school is seen as a "safe" spot. Many parents come to school functions, programs, and conferences.

Data Collection

Construction of the Data Collecting Instrument. A questionnaire was used to assess the opinions of students before introduction to networking. The questionnaire was constructed after research of already existing questionnaires which have been used to assess computer opinions. However, most questionnaires the author found were dated in the mid-1980's and do not include networking. They also seem to assume that participants have little or no computer knowledge. Based on the new technology and the fact that students at the writer's school have been using computers since kindergarten, the writer devised a more relevant questionnaire.

Administration of the Data Collecting Instrument. Students answered questions from the questionnaire on a Likert-style scale answer sheet (see Appendix B). Students had a choice of five answers to select from: "really agree"; "somewhat agree"; "not sure"; "somewhat disagree" and "really disagree". The questions were read to the students. Students were not be allowed to make comments or talk to one another so they would not influence one another's opinions or answers. Questions were scored, charted, and compared.

Design

Students were pretested to determine their computer opinions using the questionnaire in Appendix A.

Students were introduced to networking, received instruction on hardware and software needs, were given choices as to the activities they wished to become involved with and spent some time using Internet.

Students took a posttest to determine their computer opinions after using networking. The posttest was the same questionnaire as the pretest. Questions were again scored, charted, and compared.

Treatment

The independent variable in this study was the students' use of computer networking. This treatment started with the taking of the pretest questionnaire to assess the opinions prior to the treatment.

First students explored and discussed an Apple IIe computer that had the cover removed. They looked at the cards, cables, switches, keyboard, and disk drive. They discussed the thinking and communication capabilities of the computer. Students learned that the computer was incapable of thinking on its own, but used information given by disk, internal memory, keyboard, or other peripheral device.

Students were taught to use a telephone connection to dial and connect with Freenet. Freenet is the local access through a large university computer from which one gains entrance to Internet. For several lessons, students learned about the menus in Freenet and Internet. Students looked at

space information and launch data from the government, checked the weather in several cities around the world, checked the school system on-line newsletter, looked at several student-oriented discussion groups, and were given time to explore any branch of the Internet they wished. Students continue to explore Internet two to three times per week.

Following this step, the class joined several projects initiated by schools in other areas. The first project was a project in which schools in different latitudes and longitudes would measure the shadow of a meter stick at noon on a given day. Using the information gathered from several locations, the circumference of the earth could be estimated. The date had to be changed several times due to rains in California, storms in Colorado, and snow in Ohio. Finally the weather cooperated, the students completed their measurements. The results were e-mailed back to the originating school. The results from all schools will be tabulated and the conclusion will be e-mailed to all participating schools when completed.

The next project the class participated in was following a modern day explorer through his travels around the world in a truck. The explorer started in the United States, drove through Central America, through parts of South America to Terre Fuego. He and his truck were then transported to Australia. He spent several weeks in Australia and will go to Japan next.

During his travels, the explorer e-mails back information about the area, the people, the customs, and the economy to the students. He made a special point to visit schools to talk about the United States and e-mails back information about the schools, teachers, and children he meets. Students in the United States can e-mail questions for him to answer or to find out about while he is in a foreign land. All the questions and his answers are e-mailed to all the schools involved. He also tried to match a school where he is visiting to a school back in the United States so communication can continue on a personal level.

The students in the author's classroom made an enlarged map of the world and by using cut-outs of truck and yarn are tracking the explorer. They got books out of the library on each area the explorer visited and did research. They read the questions and answers from the explorer's contact schools and discussed the information.

The students sent an e-mail request for a picture of the explorer and his truck. The day the picture arrived was a red-letter day. The students received their first confirmation that there were actually people somewhere out there. The tracking, reading, and research became more excited and intense. The class researched Australia, made an Australian map, and did cooperative research to learn as much about Australia as they can. They are looking forward to "going" to Japan next.

The next project the students were involved in was a gun control survey. They discussed the implications of gun control then completed the survey. The students live in an area where several drive-by shootings have occurred and where many students avoid certain streets because they may be the victims of "target practice" as they walk to school. Several students did not want to answer the question about whether someone in their household owns a gun. They were assured that names would not be used and the results of the survey would be destroyed by the teacher. They were advised to use their best judgements in answering questions. However, the students overwhelmingly wanted to complete the survey because they saw this as one way to have their voice heard so that someday guns will be eliminated.

The last involvement was to take part in a project where students would complete a questionnaire about the area their school was located. Then they e-mailed back their information. When twenty-five have been received, the originating school e-mailed the information out as clues. That school would also send the names and addresses of the twenty-five schools. The students then must try to match the clues about the school's area to the school's name and address.

Students in the author's classroom cut out the clues and glued them on poster board. They glued the answers on another board. Then they matched the schools that were easy to match.

Some schools had tourist areas or landmarks that the students recognized immediately. Others did research using encyclopedias, books about states, atlases, and researched on Internet. When the class was satisfied that the information was matched correctly, the class e-mailed back their guesses to the originating school. The students will get an answer to their first puzzle when the due date has expired.

At the conclusion of this project, students took a posttest questionnaire about their opinions of computers and networking. The results of the pretest opinion questionnaire and the posttest opinion questionnaire were compiled and compared.

CHAPTER IV

RESULTS

Presentation of the Results

The following pages present the results of the pretest and posttest opinion questionnaires. They are displayed as follows:

Table I - Boys' Answers - Comparison of the Pretest (T1) and Posttest (T2). This table gives a portion of each of the questions from the questionnaire, identifies the question as a positive or negative question, and gives the number of students involved. The next sections show the percentages of boy students who marked their Likert answer sheet in five categories. There are two percentage columns; one is for pretest (T1) percentages and one for posttest (T2) percentages.

Table II - Girls' Answers - Comparison of the Pretest (T1) and Posttest (T2). This table gives a portion of each of the questions from the questionnaire, identifies the question as a positive or negative question, and gives the number of students involved. The next sections show the percentages of girl students who marked their Likert answer sheet in five categories. There are two percentage columns; one is for pretest (T1) percentages and one for posttest (T2) percentages.

Table III - All Students' Answers - Comparison of the Pretest (T1) and Posttest (T2). This table gives a portion of each of the questions from the questionnaire, identifies the question as a positive or negative question, and gives the number of students involved. The next sections show the percentages of all students who marked their Likert answer sheet in five categories. There are two percentage columns; one is for pretest (T1) percentages and one for posttest (T2) percentages.

TABLE I

BOYS' ANSWERS - COMPARISON OF PRETEST (T1) AND POSTTEST (T2)

QUESTION	POS/ NEG QUEST	N	PERCENTAGE REALLY AGREE		PERCENTAGE AGREE		PERCENTAGE NOT SURE		PERCENTAGE DISAGREE		PERCENTAGE STRONGLY DISAGREE	
			T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
1. Computer classes a waste	N	25	0	0	8	8	0	8	25	17	67	67
2. C. don't scare me	P	25	58	75	0	0	8	17	0	0	33	8
3. Girls can do like boys	P	25	58	58	0	0	17	8	0	0	25	33
4. Good grades = nerd	N	25	17	17	0	0	8	0	8	17	67	67
5. Future help as job	P	25	58	67	8	8	33	17	0	0	0	8
6. Like hard C. problems	P	25	25	67	8	17	8	8	25	0	33	8
7. I can use C.	P	25	67	67	0	17	33	8	0	0	0	8
8. Find it hard to stop	P	25	50	42	8	8	8	8	0	8	33	33
9. Wouldn't tell good grades	N	25	17	42	8	0	8	8	0	0	67	50
10. Tests scare me	N	25	33	8	8	0	17	17	8	0	33	75
11. Like Freenet/Internet	P	25	50	58	25	0	17	25	0	0	8	17
12. Like C. problems	P	25	58	67	17	8	8	8	0	0	17	17
13. Why do people like C.	N	25	33	17	8	8	17	8	0	0	42	67
14. Help in future use	P	25	58	58	17	0	25	33	0	0	0	8
15. I have self-confidence	P	25	50	58	25	17	25	17	0	0	0	8
16. Girls who use are weird	N	25	33	42	0	0	0	0	0	0	67	58
17. C. problems boring	N	25	8	17	8	0	8	25	0	0	75	58
18. I'm smart with C.	P	25	83	58	0	17	0	17	0	0	17	8
19. Glad there are more C.	P	25	83	42	8	17	0	33	0	0	8	8
20. Internet scares me	N	25	0	25	0	0	17	8	8	0	75	67
21. C.not important in work	N	25	8	17	0	0	25	33	8	0	58	50
22. C. makes me think	P	25	67	67	8	8	8	8	0	8	17	8
23. Will not take C.courses	N	25	8	17	17	0	17	17	0	0	58	67
24. Would like to keypal	P	25	75	58	8	17	8	17	8	0	0	8
25. C. make me feel stupid	N	25	0	0	0	0	17	17	0	8	83	75
26. I like networking	P	25	33	50	8	0	17	25	17	8	25	17
27. Would like to know more	P	25	83	58	0	0	17	25	0	0	0	17
28. I do very little work	N	25	17	8	8	0	8	25	8	25	58	42
29. I'd like to be best	P	25	83	67	0	8	0	8	0	0	17	17
30. I feel sick inside	N	25	8	8	0	0	17	17	17	0	58	75

TABLE I

BOYS' ANSWERS - COMPARISON OF PRETEST (T1) AND POSTTEST (T2)

TABLE II

GIRLS' ANSWERS - COMPARISON OF PRETEST (T1) AND POSTTEST (T2)

QUESTION	POS/ NEG QUEST	N	PERCENTAGE REALLY AGREE		PERCENTAGE AGREE		PERCENTAGE NOT SURE		PERCENTAGE DISAGREE		PERCENTAGE STRONGLY DISAGREE	
			T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
1. Computer classes a waste	N	25	0	0	0	0	0	0	15	23	85	77
2. C. don't scare me	P	25	62	69	0	0	15	23	8	0	15	8
3. Girls can do like boys	P	25	69	85	0	0	15	8	0	0	15	8
4. Good grades = nerd	N	25	0	8	8	0	15	15	8	0	69	77
5. Future help as job	P	25	54	54	8	15	23	31	0	0	15	0
6. Like hard C. problems	P	25	54	54	8	23	23	0	0	23	15	0
7. I can use C.	P	25	77	69	8	15	15	15	0	0	0	0
8. Find it hard to stop	P	25	38	69	8	8	31	23	8	0	15	0
9. Wouldn't tell good grades	N	25	15	8	0	0	0	0	0	8	85	85
10. Tests scare me	N	25	15	23	0	0	23	8	15	8	46	62
11. Like Freenet/Internet	P	25	85	69	8	8	0	15	0	0	8	8
12. Like C. problems	P	25	62	77	15	8	15	8	0	0	8	8
13. Why do people like C.	N	25	15	8	8	0	8	8	0	15	69	69
14. Help in future use	P	25	54	54	8	8	23	31	0	0	15	8
15. I have self-confidence	P	25	69	69	8	15	15	15	0	0	8	0
16. Girls who use are weird	N	25	0	0	8	0	0	0	0	0	92	100
17. C. problems boring	N	25	0	0	0	0	8	0	0	15	92	85
18. I'm smart with C.	P	25	92	69	0	15	8	0	0	15	0	0
19. Glad there are more C.	P	25	69	69	8	15	8	8	0	0	15	8
20. Internet scares me	N	25	0	0	8	0	8	0	0	8	85	92
21. C.not important in work	N	25	0	0	8	0	8	23	0	0	85	77
22. C. makes me think	P	25	92	85	0	15	8	0	0	0	0	0
23. Will not take C.courses	N	25	0	0	0	15	0	8	8	0	92	77
24. Would like to keypal	P	25	92	92	0	0	0	8	0	0	8	0
25. C. make me feel stupid	N	25	0	0	0	0	8	8	0	0	92	92
26. I like networking	P	25	54	69	8	8	31	23	0	0	8	0
27. Would like to know more	P	25	85	69	8	23	0	8	0	0	8	0
28. I do very little work	N	25	8	0	8	8	0	0	8	15	77	77
29. I'd like to be best	P	25	77	54	0	15	15	23	0	8	8	0
30. I feel sick inside	N	25	23	0	0	8	0	15	23	15	54	62

TABLE II

GIRLS' ANSWERS - COMPARISON OF PRETEST (T1) AND POSTTEST (T2)

TABLE III

ALL STUDENTS' ANSWERS - COMPARISON OF PRETEST (T1) AND POSTTEST (T2)

QUESTION	POS/ NEG ' QUEST	N	PERCENTAGE REALLY AGREE		PERCENTAGE AGREE		PERCENTAGE NOT SURE		PERCENTAGE DISAGREE		PERCENTAGE STRONGLY DISAGREE	
			T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
1. Computer classes a waste	N	25	0	0	4	4	0	4	20	20	76	72
2. C. don't scare me	P	25	60	72	0	0	12	20	4	0	24	8
3. Girls can do like boys	P	25	64	72	0	0	16	8	0	0	20	20
4. Good grades = nerd	N	25	8	12	4	0	12	8	8	8	68	72
5. Future help as job	P	25	56	60	8	12	28	24	0	0	8	4
6. Like hard C. problems	P	25	40	60	8	20	16	4	12	12	24	4
7. I can use C.	P	25	72	68	4	16	24	12	0	0	0	4
8. Find it hard to stop	P	25	44	56	8	8	20	16	4	4	24	16
9. Wouldn't tell good grades	N	25	16	24	4	0	4	4	0	4	76	68
10. Tests scare me	N	25	24	16	4	0	20	12	12	4	40	68
11. Like Freenet/Internet	P	25	68	64	16	4	8	20	0	0	8	12
12. Like C. problems	P	25	60	72	16	8	12	8	0	0	12	12
13. Why do people like C.	N	25	24	12	8	4	12	8	0	8	56	68
14. Help in future use	P	25	56	56	12	4	24	32	0	0	8	8
15. I have self-confidence	P	25	60	64	16	16	20	16	0	0	4	4
16. Girls who use are weird	N	25	16	20	4	0	0	0	0	0	80	80
17. C. problems boring	N	25	4	8	4	0	8	12	0	8	84	72
18. I'm smart with C.	P	25	88	64	0	16	4	8	0	8	8	4
19. Glad there are more C.	P	25	76	56	8	16	4	20	0	0	12	8
20. Internet scares me	N	25	0	12	4	0	12	4	4	4	80	80
21. C.not important in work	N	25	4	8	4	0	16	28	4	0	72	64
22. C. makes me think	P	25	80	76	4	12	8	4	0	4	8	4
23. Will not take C.courses	N	25	4	8	8	8	8	12	4	0	76	72
24. Would like to keypal	P	25	84	76	4	8	4	12	4	0	4	4
25. C. make me feel stupid	N	25	0	0	0	0	12	12	0	4	88	84
26. I like networking	P	25	44	60	8	4	24	24	8	4	16	8
27. Would like to know more	P	25	84	64	4	12	8	16	0	0	4	8
28. I do very little work	N	25	12	4	8	4	4	12	8	20	68	60
29. I'd like to be best	P	25	80	60	0	12	8	16	0	4	12	8
30. I feel sick inside	N	25	16	4	0	4	8	16	20	8	56	68

TABLE III

ALL STUDENTS' ANSWERS - COMPARISON OF PRETEST (T1) AND POSTTEST (T2)

Discussion of the Results

Todman and Dick (1993) found more positive attitudes toward computer use in primary school than in secondary school. This author's results agreed with Todman and Dick's results. The research showed that the fifth grade students studied had favorable opinions towards computers even before treatment was given. A large percentage of boys stated that they "really agree" that they would like to know more about computers and they would like to be the best student in the class. The boys also were glad that there are more computers now and they thought that they were smart when using computers. The girls' pretest answers show a high percentage who think that they are smart with computers, like the way the computer makes them think, and want to be keypals with other students.

A comparison of the boys' pretest and posttest results showed a large increase in boys who were not scared of computers or of tests about computers. However, there was a decrease in the number of boys who thought that they were smart with computers.

A comparison of the girls' pretest and posttest results showed that a few more girls were not scared of computers and were not scared of computer tests. There was also a decrease in the number of girls who thought that they were smart with

computers. This decrease in opinion of smartness in both sexes may be attributed to the treatment - the introduction of networking. Some students were overwhelmed with the choices and areas available in networking and this may have influenced the opinion of their abilities.

A comparison of all students' pretest and posttest results showed greatest increases in the areas of computer confidence, willingness to attack hard problems, and networking. Dalton and Goodrum (1991) stated that the use of computers expressed more favorable attitudes than learners not exposed to computers. Funkhouser (1993) stated that computer-aided instruction may have positive side effects. Therefore, the fact that the students in this study used computers more than usual may have affected their opinions favorably.

Ashkar, Yovuz, and Koksal (1992) stated that no significant difference was found between the computer opinion of boys and girls. This study found that this was true since that in most of the categories, the answer percentages were similar in both boys and girls. However, fifty-eight percent (in pretest and posttest results) of the boys thought girls could use computers as well as boys. About thirty-three percent of boys in pretest increasing to forty-two percent in posttest thought girls who like computers were weird. On the other hand, after treatment, eighty-five percent of the girls

thought they could use computers as well as boys and an overwhelming one hundred percent thought that girls who used computers were not weird.

A comparison of all students in the extreme areas of "strongly agree" and "strongly disagree" showed that posttest opinion increased in sixteen question areas, decreased in eleven, and stayed the same in three areas.

The introduction of networking increased motivation but also opened some areas of self-doubt in some students. Maddux (1994) stated that Internet can be of immense educational value, but too many educators seem concerned only with making the Internet accessible to students and far too few seem concerned with making sure that it will be used in educationally appropriate ways. Doing as Maddux suggests takes time. This researcher spent many hours on the Internet to become familiar enough to teach selected areas to the students. To thoroughly indoctrine each student to Internet and monitor the areas the student accesses takes time away from the current curriculum and class time. The teacher must determine how much time is enough and how much indoctrination each student must receive. The students realized that it would take many hours to fully explore Internet and this was overwhelming to many. Others were excited about networking and wanted more time on the computer than was possible.

To summarize, students stated that they will continue using computers. They were still unsure if they would like a job just using computers, but they would like to learn more about computers and networking. The overall opinions of computers in the class increased after treatment. Todman and Dick (1993) stated that differences in children's attitudes to computer use are likely to be related to both home and school experiences with computers. This is true in this case due to the early introduction of computers, the positive attitudes toward computers already existent at the school, and the extended use of computers for this study. The pretest results show that the class had very positive opinions regarding computers already. Most of the boys and girls thought themselves capable of using a computer. The posttest showed that the treatment seemed to increase positive opinions about computers and networking in both girls and boys. There was a big increase in the opinion of networking in both sexes. The introduction of networking motivated many students and opened many avenues of computer use that were unknown to the students before treatment.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Students must receive instruction in computer education to prepare for the future, to keep current with modern day electronic advancements, to increase cognitive skills needed in today's world, and to be adequately prepared for the business and educational world. Because of the overwhelming presence of computers in today's society, schools are expected to give students positive, introductory experiences using computers.

The purpose of this study was to compare and contrast the opinions of fifth grade students toward the integration of computers with electronic networking communications.

The author gave a pretest to twenty-five inner-city fifth grade students who attend a math and science alternative school. Students were then given instruction about computers, introduced networking, Freenet, and Internet to the students. The students participated in projects, used e-mail, and did research and information gathering in the areas that they were studying. Students then took a posttest to determine their opinion after introduction to networking.

The results showed that while the students were had positive opinions about computers at the beginning of the study, the treatment increased their opinion toward networking, global communications, and prevalent use of computers in schools.

Conclusions

In conclusion, this author recommends that computers be included in the curriculum of all elementary schools. Reasons to include computers in the curriculum included an increase in student motivation, decrease in discipline problems, and the usefulness of computers in all educational areas. There is a substantial need for today's student to have experience in computers both for their present educational needs and for future employment and business needs. Schools must keep up with advancements and new products in the electronic and computer field. It is up to today's innovative teachers to insist that students receive this necessary instruction.

Recommendations

After reading the results of this study, it is recommended that parents and teachers investigate the computer education of their children and students. Make sure that they are adequately being instructed in computer education and that networking has been introduced to older students. Affirm that there are computers in use in your school and that they are

being used to their best advantage. If there are problems funding the technology or getting necessary equipment, perhaps parents, teachers, or any other interested person can be part of the solution. Talk to students about their feeling and fears about computers. Discuss with employers what type of computer experience they would like prospective employees to have. Make sure teachers are adequately trained in computers and that schools include some type of computer curriculum in their educational blueprint.

APPENDIX A

QUESTIONNAIRE

Measures of Computer Attitudes

1. Computer classes are a waste of time.
2. Computers don't scare me.
3. Girls can work computers as well as boys.
4. People would think that I was some kind of nerd if I got high grades in computers.
5. In the future, computers will help me earn a living.
6. I like computers problems that are hard and that I can't understand right away.
7. I am sure I could do work with computers.
8. Once I start working with a computer I find it hard to stop.
9. If I had good grades in computer class, I wouldn't tell my friends.
10. A computer test would scare me.
11. I would like to use Freenet and Internet.
12. I like computer problems.
13. I don't understand how some people can spend so much time working with computers and seem to like it.
14. Computers will make a big difference to me in the future.
15. I have a lot of self-confidence when it comes to using computers.
16. Girls who like computers are a little weird.
17. Computer problems are boring.
18. I'd like people to think I was smart with computers.
19. I'm glad there are more computers these days.

20. I do not want to use Internet - it scares me.

21. Computers will not be important to me in my life's work.

22. I enjoy using a computer; it makes me think.

23. I would not like to take more computer courses.

24. I would like to talk to other fifth graders in other parts of the world using Internet.

25. Computers make me feel stupid.

26. I like writing to other classrooms using networking.

27. I would like to know more about computers.

28. I do as little work as possible when we use computers.

29. I'd like to be the best student in my computer class.

30. I feel sick inside when I think of trying to do something hard with a computer.

APPENDIX B

ANSWER SHEET FOR COMPUTER SURVEY

NAME_____

CIRCLE THE ANSWER YOU THINK IS BEST - KEEP YOUR FINGER ON THE QUESTION NUMBER

1.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
2.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
3.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
4.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
5.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
6.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
7.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
8.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
9.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
10.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
11.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
12.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
13.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
14.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
15.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE

16.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
17.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
18.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
19.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
20.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
21.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
22.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
23.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
24.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
25.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
26.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
27.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
28.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
29.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE
30.	REALLY AGREE	SOMEWHAT AGREE	NOT SURE	SOMEWHAT DISAGREE	REALLY DISAGREE

COMMENTS:

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